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August 30, 2022

CAPT Cameron Geertsema
NAVFAC Hawaii
850 Ticonderoga St., Suite 110
Joint Base Pearl Harbor Hickam, Hawaii 96860
(*letter sent via electronic mail*)

Subject: Response to Navy's May 20, 2022 and June 15, 2022 Submittals
Red Hill Groundwater Flow and Contaminant Transport Modeling

Dear Captain Geertsema:

In a letter dated March 17, 2022, the U.S. Environmental Protection Agency ("EPA") and Hawaii Department of Health ("DOH") disapproved the March 25, 2020, deliverable titled "Groundwater Flow Model Report" ("GWFMR") and the associated numerical groundwater flow models. The GWFMR was submitted by the U.S. Department of Navy ("Navy") and Defense Logistics Agency to satisfy Section 7.1 of the 2015 Administrative Order on Consent Statement of Work ("AOC SOW") for the Red Hill Bulk Fuel Storage Facility ("Facility") located in O'ahu, Hawai'i.

Our March 2022 letter identifies material defects in the GWFMR and the accompanying numerical groundwater flow models and directed the Navy to submit, within 60 days, a plan to cure multiple deficiencies identified by EPA and DOH ("Agencies") in the Navy's groundwater flow models, make needed improvements to the models, and submit a revised GWFMR by June 15, 2022.

The Navy's 60-day submittal dated May 20, 2022, states that the deficiencies could not be adequately addressed by the June 15, 2022, deadline. The Navy proposed a plan to address the deficiencies outlined in the March 2022 letter over the next six (6) months with submittal of a revised GWFMR and accompanying numerical groundwater flow model, and submittal of a contaminant fate and transport and vadose zone model in 2023. The Navy further responded in a

June 15, 2022, letter describing recent progress made in addressing GWFMR deficiencies. The June submittal shows progress but is not fully responsive to our disapproval letter, particularly in the absence of a clear commitment to further refine the 3-D geologic model presented in the 2019 conceptual site model report (CSM), or a demonstration of increased understanding of subsurface conditions that better represents the hydrogeologic system.

Much work remains to address deficiencies in the GWFMR. Given the scope and duration of work to be completed by the Navy before a trustworthy model is available and the need to support planning efforts currently underway to defuel the Facility, we cannot rely on the Navy proposal to support the following two (2) key short-term information needs:

i) Evaluate the potential impact to water sources threatened by past Facility releases and any additional future releases that may occur prior to completion of defueling and closure and;

ii) Determine the value of continued groundwater extraction at the Red Hill Shaft in the remediation of past and possible future releases in the Red Hill tank farm area. Preliminary Agency evaluations suggest that most of the water entering Red Hill Shaft is from portions of the aquifer deeper than the shallow water table, limiting the effectiveness of pumping Red Hill Shaft to capture spills or other releases from beneath the tank farm.

To meet these needs while the Navy is planning for the defueling, the Agencies are proceeding with our own technical analyses independent of the Navy. We expect the results to be available more quickly than would be possible if we wait to complete development of numerical groundwater flow and contaminant fate and transport models. We also expect this approach to provide greater transparency and information sharing with the public and interested stakeholders while GWFMR deficiencies are addressed.

The Agencies will continue to work with the Navy on the development of numerical groundwater flow, vadose zone, and contaminant fate and transport models to improve our understanding of the movement and fate of contaminants released from the Facility. The ultimate usefulness of the models will depend on the Navy's willingness, in a timely manner, to fully address the deficiencies identified in our March 2022 letter. The Navy should proceed with the efforts described in its 60-day submittal with the following conditions and changes:

1) Make a continued and concerted effort to cure deficiencies identified by the Agencies in their March 17, 2022, letter. Among the deficiencies are the poor match between measured and modeled groundwater gradients and elevations, the underutilization of the available geologic and hydrogeologic data to interpret conditions at and near the water table, and assumptions about the source of water to the Red Hill Shaft;

2) Provide timely communication on progress, emphasizing decisions made to resolve each model deficiency;

3) Produce interim products and modeling runs to share and demonstrate key approaches the modelers are using to cure deficiencies;

4) Eliminate the Navy's proposed multiday "charettes" and reduce the planned meeting time with the Agencies over the next 6 months to a more manageable level (approximately 6-8 hours per month, with significant focus on direct interaction with modelers); and

5) Provide copies of draft numerical model files, Environmental Visualization System (EVS) renderings, and other applicable information to the Agencies in advance of meetings.

We believe that this approach, in which the Agencies proceed with independent analyses to meet key short-term needs and continue to work with the Navy to develop a credible and useful set of numeric groundwater models, will best protect O'ahu water resources from past and threatened releases from the Facility. If the Agencies determine from our analyses that additional actions are needed by the Navy, the Agencies may require the Navy to perform additional work in accordance with section 8(c) of the AOC. Based on the Navy's planned schedule for defueling, the requirement for additional work may come before the Navy completes its groundwater and contaminant fate and transport modeling.

We will follow up later this week to share our ideas on how to proceed. Please contact the undersigned if you have any questions about this letter.

Sincerely,

GABRIELA CARVALHO

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